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- John Nez Hootonie Begay's child; female; age, 34.
 John Nez Hootonie Begay; male; age, 30. Wife survived.
 John Nez Hootonie Begay's nephew; male; age, 18.
 Dura Clizhen; male; age, 35. Four children; ages, 15, 12, 10 and 5 years. Wife survived.
 Dura Clizhen's brother; male; age, 25. One child. Wife survived.
 Nokai Denas; four children.
 Hosteen So Bitse; female; age, 4.
 Dayteen Bitsoie's boy; age, 18.
 Dayteen Bitsoie's girl; age, 9.
 Dayteen Bitsoie's boy; age, 8.
 Dayteen Bitsoie's child; age, 6 months.
 Eshin Sosie Bitse; female; age, 6 months.
 Dogi Yazzie; male; age, 20.
 Dogi Yazzie's wife.
 Dogi Yazzie's child; age, 18 months.
 Dogi Bitdaizy; female; age, 30.
 Dogi Bitdaizy's husband.
 Dogi Bitdaizy's child; age, 7.
 Dogi Bitdaizy's child; age, 5.
 Dogi Bitdaizy's child; age, 3.
 John Nez Hoolonie Benullie; age, unknown.
 Belin Cizhin Beti Bitse; female; age, 10.
 Hosteen Yazzie Bitsilly's child; age, unknown.
 Similie Bidoney's granddaughter.
 Tom Holliday's son; age, 22.
 Tom Holliday's second wife; age, 55.
 Hosteen Chee Bitsee.
 Jah Nez Holoeice Begay.
 Jah Nez Holoeice Begay; relative.
 Crank's son; male; age, 21.
 Similie Bidonny; male; age, 50.
 Maud; a school girl; age, 16.

Five Piutes were also found dead on the trail between here and the San Juan river. I had them buried by the two Mormon men who discovered them.

Some Suggestions on Climate.

ALBERT B. REAGAN.

In August, 1913, while I was Indian agent at Nett Lake, Minn., I visited my mother at Fredonia, Kan., and found the whole country burning up with drouth and scorching sun. At the same time the newspapers at Duluth, Minn., were printing headlines, "Its Cool at Duluth." Moreover, in northern Minnesota it was raining nearly every day. Last winter (1917-'18) the eastern part of the United States to some distance west of the Mississippi river was snowed under and experienced the worst winter in years, while at the same time the western United States, the Rocky Mountains and the plains had scarcely any winter, the lightest in many years. This winter (1918-'19) the Rocky Mountains and the plains have the severest winter in years and the East hardly any winter at all. Congressman C. B. Miller writes me that Minnesota has a "banana" winter, it is so warm.

It would seem that wherever the cold wave first strikes in the early winter sufficiently to cause a heavy blanket of snow to fall, a cold area is there generated, and as cold, like anything else, tends to perpetuate itself, the accumulation of cold and consequent snow continues in that area till the re-

turn of the spring and summer sun effaces it. Furthermore, the rushing of the colder air to this region leaves the warmer air to occupy the other adjacent regions. In summer it would seem that the excessive heating of certain areas acts in a similar manner. It would also seem that cloudy weather, contrary to the general belief, perpetuates cold, at least in mountain regions. For instance, in clear years it is not cold in the Navajo country. This winter, a very cloudy one, the mercury has gone as low as 35 degrees below zero. Also in the cloudy, rainy Olympic country of Washington there are extensive glaciers, though the mountains, even in highest points, do not exceed 8,000 feet in elevation; while mountains in the drier regions of Washington, Idaho and Montana in the same latitude, though of practically the same elevation, possess no glacier fields. It appears that if there was no more precipitation in western Washington than there is in, say, Arizona, the glaciers of the Olympic mountains would not exist.

The writer hopes that others who have better facilities for observation will look further into this subject.

Scientific Measurement of the Achievements of Pupils.

F. J. KELLY, Dean School of Education, University of Kansas.

Advancement of any science depends primarily upon the accuracy with which the materials entering into that science can be measured. Until education can measure its products more accurately than it yet does, the claim that education is a science will not be generally allowed. It is the purpose of this paper to indicate some of the steps which have been taken to make possible a more accurate measurement of pupils' achievements.

Before telling of these recent efforts in deriving more accurate measures we must set forth quantitatively the extent of inaccuracy which prevails in our ordinary measures of educational products. We are constantly measuring the results of instruction. Examinations have been a part of school procedures ever since schools existed. On the basis of these examinations honors are awarded, pupils are encouraged to think that they are brilliant, or discouraged to think that they are stupid. Civil-service positions are awarded; teachers are granted certificates to teach; in fact, very much of our social structure rests upon examinations, which are the present-day measures of achievement. How reliable or unreliable these measures are is not generally known among people, even those engaged in educational work. There is just a sort of vague feeling that they are not a very satisfactory means of determining achievement.

The three most typical studies revealing the extent of the reliability of the examination paper as a measure are (1) that of F. Y. Edgeworth, professor of political economy in the University of Oxford; (2) those of Starch and Elliott, of the University of Wisconsin; and (3) that of the writer. Professor Edgeworth raised the question of the validity of the civil-service examinations in England, and in order to measure the reliability of the ratings upon the civil-service examination papers he sent facsimile reproductions of one of the examination papers to a group of twenty-eight head masters of the schools from whom examiners were chosen. Any one of the twenty-eight head masters was admitted by the civil-service commission to be competent to rate